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AGE, ORIGIN, AND CROWN INJURIES AFFECT GROWTH OF SOUTH JERSEY PINES

Pines in the Pine Region of southern New Jersey differ greatly in their rates of growth. In a few areas unthinned stands have grown fast, producing 35-40 cords in 45 years. In such areas dominant pines 7 years old may be 12 feet tall, and early diameter growth be at the rate of 1 inch in 3 years. But in most areas the growth is slow. Pines 25 years old may be only 5 feet tall, and large pines may add only 1 inch to their diameters in 15 years. Volume growth is correspondingly slow.

The few good stands are those where the pines started as seedlings, were not suppressed, and were never damaged by severe fires. The poorest, slowest-growing stands seem always to be of sprout origin from old stools. And the large pines on most areas have poorly formed crowns with many small branches along the boles, because wild fires have repeatedly damaged the

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crowns, forcing the development of new branches and terminal shoots from dormant buds.

As yet the proof is inadequate, but the evidence strong, that age, origin, and crown injuries affect the growth of pines in southern New Jersey more than site differences. Wherever natural stands of seedling pines uninjured by fires have been created, their growth has been markedly superior to that of the usual stands.

An Example

Let's look at one $2\frac{1}{2}$ -acre area. It formerly had an oak-pine stand, most of which had lived through four wild fires between 1870 and 1904. Following these fires, some pine reproduction became established. Between 1936 and 1946 the area was treated with 10 prescribed fires, and then in the winter of 1946-47 all the oaks were cut.

In the fall of 1950 this area had 25 pines 6 to 13 inches in diameter (breast high), a scattering of small pines 5 to 16 feet tall that had started after the wild fires, and a large number of seedlings that had developed during or after the period of prescribed burning. (However, because of deer browsing most of these seedlings had not reached a height of 2 feet at the end of the 1948 growing season.)

Twenty-five trees of each of the three groups were measured in the fall of 1950. These included all of the overstory pines, most of the older reproduction, and most of the more recently established seedling pines that were at least 2 feet tall at the end of the 1948 growing season.

Comparisons Of Growth

The overstory pines grew, on the average, about 0.5 inch in diameter during the last 4 years, or twice as much as during the 4 years before the oaks were cut (0.22 inch). Nearly all the increased growth took place during the last 2 years, and nearly half of the trees did not show any increase in growth before the 1950 growing season.

The older reproduction responded more to cutting than did the overstory pines. It grew 0.3 inch in diameter in the 4 years before cutting, 0.8 inch in the same period after cutting.

Although height growth on the older reproduction also increased after cutting, it was slower than the diameter growth. Some of the long-suppressed trees had developed flat tops and are still growing little or not at all in height, even though their diameter growth has increased.

During the last 2 years the young seedling pines have grown much more rapidly in height than has the older reproduction. They grew, on the average, 1.51 feet in 1949 and 2.21 feet in 1950, while the corresponding growth averages for older reproduction were 0.38 feet and 0.54 feet. The greatest growth measured on the young seedlings was 2.0 feet in 1949 and 3.8 feet in 1950, on older reproduction 1.0 foot in 1949 and 1.7 feet in 1950.

Thus, the pines in this one small area have shown great differences in their growth rates, almost as great as those found among different stands in the Pine Region.

Conclusions

These results indicate that cuttings in oak-pine stands of southern New Jersey should usually favor the establishment and growth of vigorously growing, young pine reproduction.

Overstory trees should be cut in ways that will meet that objective. Cuttings to stimulate their growth should not usually be attempted, because only occasional trees will show both immediate and great response (jumping their growth in diameter to 1 or 2 inches in 3 years). Long-suppressed, relatively old pine reproduction can also be disregarded.

--S. LITTLE and H. A. SOMES

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